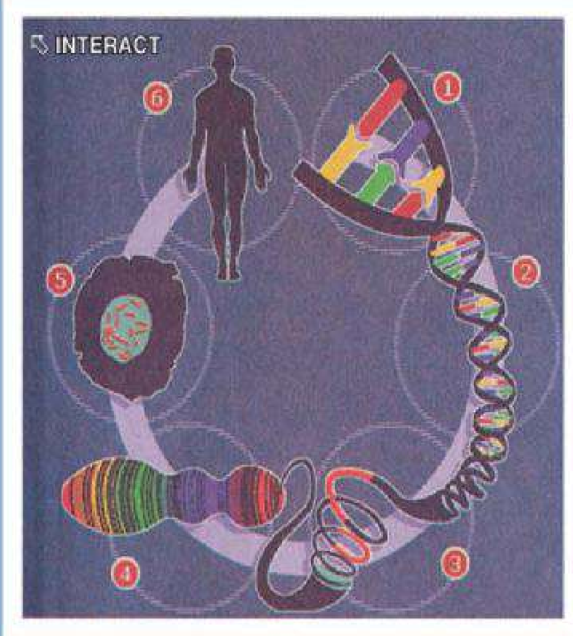


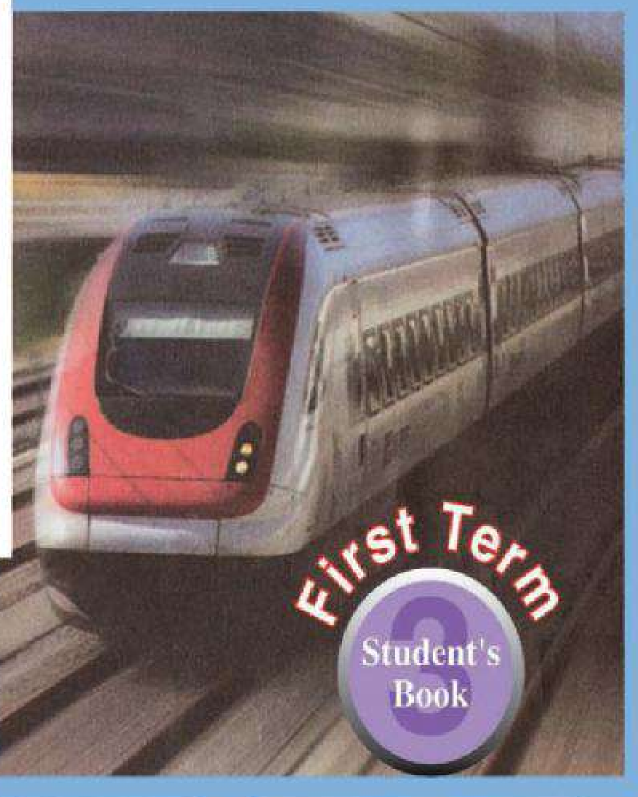
Arab Republic of Egypt
Ministry of Education &
Technical Education
Central Administration of
Book Affairs

Science and Life

Discover and Learn

Third Preparatory





2023 - 2024







Third Preparatory

Exercises

First Term

Exercises

Why?

....

....

Why?

....

Conclude: What are the two factors necessary for the movement description

1 ....

2 ....

Study the previous (distance - time) graph and conclude:

What is the proportional relation between distance (d) and time (t)?

Does the car move at a uniform speed? (Yes/ No)

What is the value of the uniform speed of the car? .... meter/second

Question for thinking

- A car whose movement starts from rest and then its speed increases to 15 m/sec through 5 seconds.
- Another car whose movement starts from rest and then its speed increases to 20 m/sec through 10 seconds.
- Which of the two cars is moving at greater acceleration?

Does the object's speed increase regularly during movement? (Yes /No)

What is the value of increase in the object's speed every five seconds? ....

Calculate the value of increase in the object's speed every second? ....

What is the value of the object's acceleration during this time(30 S.)? ....

Example:



▲ Figure (13): A bus moving in a straight line .

On a straight line there is a moving bus whose speed changes from 6 meters/second to 12 meters/second during a period of three seconds, what is the value of acceleration?

Initial speed = V_1 = ... m/s

Final speed = V_2 = ... m/s

Time = ... s.

$$\text{Acceleration} = \frac{V_2 - V_1}{t} = \frac{\dots - \dots}{\dots - \dots}$$

= .... m/s^2

Mention other examples of physical quantities:

.... , ... ,

.... , ...

Mention some other examples of scalars:

.... ، .... ، ....

Why are these scalars?

....

Mention some other examples of vectors:

.... ، .... ، ....

Why are these vectors?

....

Deduce the properties of the images formed by the plane mirror through answering the following questions:

- How does the image of the letters appear in the mirror? (Inverted / upright).
- How does the size of the letters appear in the mirror? (enlarged / smaller/ equal).
- Does the image of the letters in the mirror appear inverted? (Yes / No).
- Can you receive the letters formed in the mirrors on a screen? (Yes / No).
- Did you observe that the distance of every letter to the mirror is equal to the distance of its image to the mirror? (Yes / No).

What do you abserve?

....

What does the continuous swelling of the dough look like?

....

What does the distance of the raisins represent?

....

What do you conclude of the distances between the raisins?

....

Lesson 1 exercises

1 Define the following:

a) Uniform speed.
b) Average speed.

2 Write a suitable word to complete the following sentences:

a) The result of multiplying a speed of a moving object by time = ...
b) .... is defined as the covered distance within a unit time.
c) Speed measurement units are .... or ....
d) The result of dividing the total distance that a moving object covers by the total time taken to cover this distance = ...

3 Write the scientific term that corresponds to each of the following statements:

a) The distance that a moving object covers within a unit time.
b) A moving object covers equal distances at equal periods of time.
c) The total distance that a moving object covers divided by the total time taken to cover this distance.
d) The value of an object's speed relative to the observer.

4 What is meant by each of the following:

a) The average speed of a moving car is 70 kms/hour.
b) A car moving at a uniform speed = 80 kms/hour.
c) A moving car covers a distance of 100 kilometers in two hours.
d) An object moving in a straight line, covers a distance of 20 meters in one second.

5 A boy on a bike covers 300 meters in a minute and 420 meters in the next minute. Calculate its average speed.

Lesson 2 exercises

1 Put a (✔) in front of the correct answer:

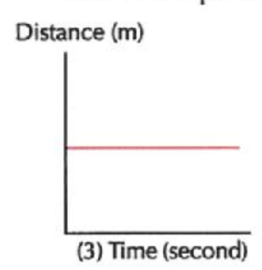
a) Acceleration is:

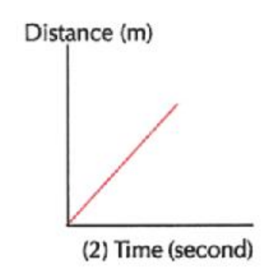
1 Change in distance in unit time.
2 Change in speed in unit time.
3 Rate of change of distance relative to the speed.

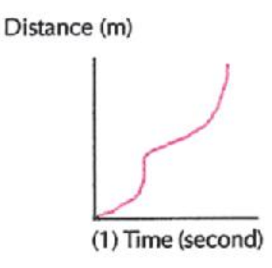
b) Movement is at uniform acceleration:

1 If the object's speed changes at equal values in equal time intervals.
2 If the distance that the object covers changes at equal values in equal time intervals.
3 If the average speed equals the regular speed.

c) Which of the following graphs represents the movement of an object at constant speed?







2 If an object moves from rest regularly until its speed reaches 10 meters/ second after two seconds from the start of moving, so,

a) The change of speed through two seconds = ------------------m/s
b) The change of speed through one second = ------------------m/s
c) Acceleration = -------------- m/s^2

3 On recording the results of an experiment in which an object moves, the results were as follows:

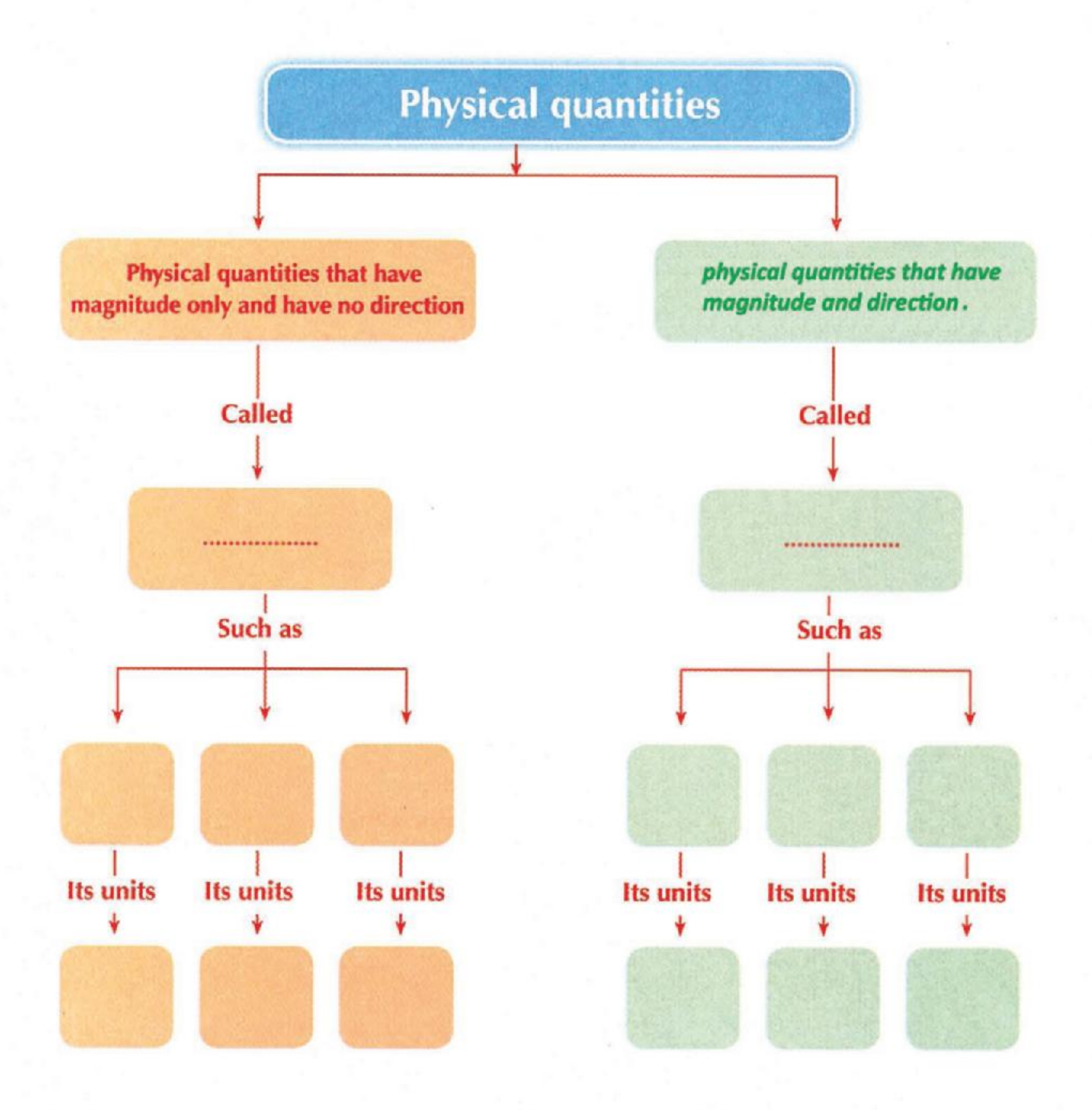
Distance (meter)	10	20	30
Time (second)	1	2	3

This object moves at:

1- Uniform deceleration.
2- Uniform acceleration.
3- Uniform speed.

Exercise: scalars and vectors

Complete the flow of concepts:



Lesson 3 exercises

1 Define each of the following:

(a) A vector quantity. (b) Scalar quantity. (c) Displacement.

2 If you move a distance of 5 meters northward and your colleague moves a distance of 5 meters southward, compare between:

(a) The distance that you covered and the distance that your colleague covered.

(b) The displacement that you covered and the displacement that your colleague covered.

3 Choose the right answer:

(a) .... is the physical quantity that both its magnitude and direction are necessary for identifying it.

1- the quantity of matter 2- Scalar quantity 3- Vector quantity

(b) Measurement units of velocity:

1- meter/second 2- meter 3- meter/second^2

4 Complete the following statements:

(a) .... is the covered distance in a constant direction and is a vector quantity.

(b) .... is the value of displacement at a unit time and is a vector quantity.

(c) .... is the quantity that is charactierized by the magnitude only.

(d) .... is the quantity that its magnitude and direction are necessary for identifying it .

5 A racer covered 50 meters northward within 30 seconds then 100 meters eastward within 60 seconds then 50 meters southward within 10 seconds, and then returns back to the start point within 40 seconds :

(a) How long is the total distance the racer moved?.

(b) What is the average speed of the racer?

(c) What is the displacement? What is the velocity?

Unit 1 Exercises

1 Choose the right answer:

a) Speed measurement unit is :
1) Meter. second. 2) Meter/second. 3)Meter/second^2

b) Acceleration measurement units is :
1)Meter/second. 2)Meter. second. 3)Meter/second^2

c) Displacement is a vector quantity and its unit is:
1)meter.
2)meter/second.
3)meter/secand^2.

d) The amount of the change in the velocity in one second equals:
1) Velocity. 2) Displacement. 3) Acceleration.

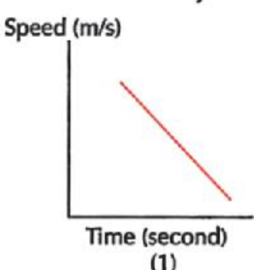
f) The object moves at constant uniform speed when:
1) It moves at zero acceleration.
2) It moves at constant acceleration.
3) It covers equal distances at unequal times.

g) It is said that the object moves at uniform acceleration when:
1) Its final speed is equal to its primary speed.
2) Its speed increases by equal amounts at equal times.
3) Covers equal distances at equal times.

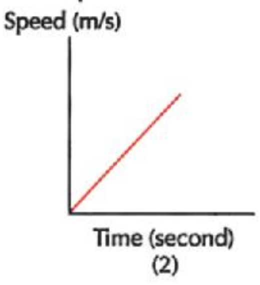
h) Acceleration is :
1) A vector whose units are m/s^2.
2) A vector whose units are m/s.
3) A scalar whose units are m/s^2.

i) The amount of change in speed at a time unit determines:
1) Velocity. 2) Displacement. 3) Acceleration

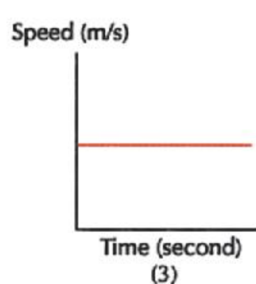
j) Which of the following graphs (speed – time) describes the movement of an object at a constant speed:



(1)



(2)



(3)

(k) A car moving on a straight line covers a total distance (d) in a total time (t), the average speed of the car is given by:

1) $\overline{V} = \frac{d}{t}$ 2) $\overline{V} = d\,t$ 3) $\overline{V} = \frac{t}{d}$

2 If an object at rest constancy moves until its speed reaches 12 m/s after two seconds of the start of movement,so:

(a) The change in the object's speed = ...m/s

(b) Acceleration = ...m/s^2

3 Problems:

(a) A special car can move from rest and its speed reaches 25 m/sec in 10 seconds. What is the acceleration with which the car moved?

(b) Within 2.5 seconds the speed of a car increases from 20 m / sec to 25 m/sec, while a bike moves from rest and its speed reaches 5 m /sec in one second.

Which of them moved at a greater acceleration?

4 Complete the missing parts in the table:

Speed (meter/s)	Distance (meter)	Time (second)
....	100	5
5	....	10
8	96	....

Lesson 1 exercises

2 Complete the following:

a) The phenomenon of the light bouncing off in the same meduim when it meets the reflecting surface is called ....

b) The point that is in the middle of the reflecting surface of the concave mirror is called ....

c) The radius of the concave mirror equals............................... of its focal length.

d) .... is the image that can be received on a screen.

e) The incident light ray parallel to the principal axis of the concave mirror, it will reflects and passing through ....

2 Choose the correct answer:

a) If the light ray falls passing through the focus of the concave mirror it will:

1- Reflect parallel to the principal axis.

2- Reflect on itself.

3- Reflect through the centre of curvature.

b) A light ray that falls on a plane mirror as in the figure it reflected where the reflection angle equals:

1- 30° 2- 60° 3- 90°

30°

c) A concave mirror with a focal length of 20 cm and the object is placed at a distance of 50 cm from the mirror, the image is formed at a distance:

1- More than 40 cm

2- More than 20 cm and less than 40 cm

3- Equals 20 cm.

d) A spherical mirror where its radius is 60 cm and, its focal length is equal to:

1- 60 cm 2- 120 cm 3- 30 cm

e) When the object is at the centre of curvature a concave mirror, the image is:

1- Real, inverted, and diminished.

2- Real, inverted, and equals to the object.

3- Virtual, inverted, and enlarged.

Lesson 2 exercises

1 Complete the following:

a) The focal length of the convex lens equals the distance between .... and ....

b) The concave lens .... the rays fall on it.

c) A convex lens the distance between its focus and optical centre is 10 cm, so the double its focal length is..........................cm.

d) The short-sighted person needs a medical eye glasses with .... lenses

e) The vision defect which is due to a shortness in the radius of the ball is called..........................

2 Choose the correct answer:

a) If a light ray falls passing the optical centre of the convex lens, it leaves the lens :

1- Passing through the focus.

2- Parallel to the principal axis.

3- Without refraction.

b) A convex lens with a focal length of 20 cm, and an object was placed 40 cm from the lens the image of the object is formed at:

1- 40 cm 2- 20 cm 3- 10 cm

c) An object placed at a distance less than the focal length of the convex lens, the propeties of the image formed are :

1- Real, inverted, and enlarged.

2- Real, inverted and smaller

3- Virtual, upright, and enlarged.

3 Show by drawing only the formation of the image equal to the object by means of a convex lens.

4 Mention the position and properties of the image formed of an object by means of a convex lens in each of the following cases:

a) The object is at a distance larger than the focal length and smaller than twice the focal length.

b) The object is at a distance equal to twice the focal length.

Unit 2 Exercises

1 Choose the correct answer from the given choices:

a If a light ray falls parallel to the principal axis of a concave mirror it reflects:

(1) Passing by the spherical centre of curvature of the mirror.
(2) Passing by the focus.
(3) On itself.

b An object is placed at the focus of a convex lens, the position of the formed image will be:

(1) Between the focus and centre of curvature.
(2) At the centre of curvature.
(3) The image is not formed.

c A concave mirror has a focal vertex of 10 cm, so the radius of curvature of its surface equals:

1 - 5 cm   2 - 10 cm   3 - 20 cm

d A convex lens has a focal length of 50 cm. An object is places at a distance of 80 cm from the lens. The image of the object is formed at a distance of

(1) Greater than 100 cm
(2) Equals 100 cm
(3) Equals 50 cm

e The image formed by using a concave lens is :

(1) Real, enlarged, and inverted.
(2) Virtual, smaller and inverted.
(3) Virtual, smaller and upright.

2 Complete the following:

a The point that is in the middle of the reflective surface of the concave mirror is called ....

b The straight line that passes by the pole of the mirror and its centre of curvature is ....

c The distance between the focus of the concave mirror and its pole is called ....

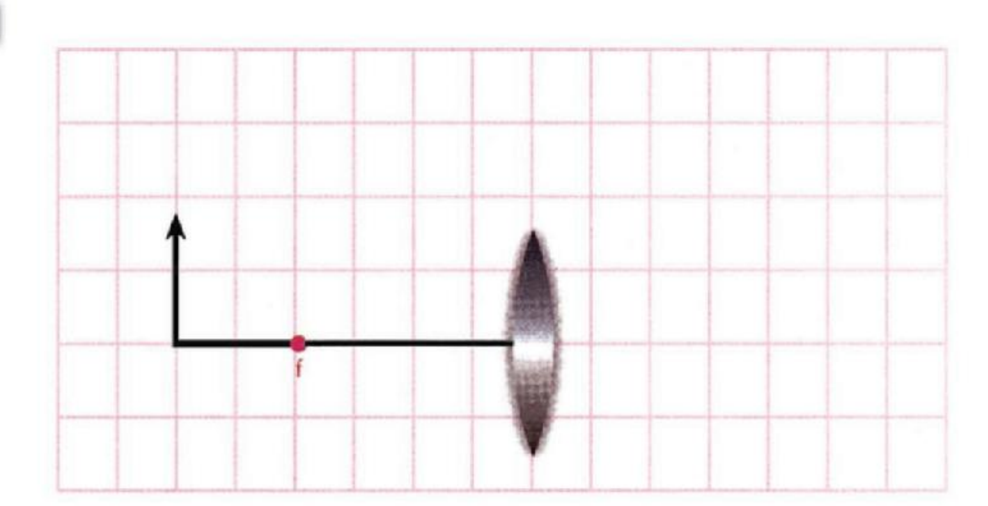
d A convex mirror has a focal length of 20 cm, then the radius of carvature of its spherical surface equals ....

e A long-sighted person needs a medical eye glasses with a .... lens

3 **Explain the following:**

- a) The focal length of the thick convex lens is less than that of the thin convex lens.
- b) The concave lens is used to treat a short-sighted person.
- c) The long-sightedness is treated by using a convex lens.
- d) The object that is placed at the focus of a convex lens does not form an image.
- e) The collective lens has two foci while the collective mirror has one focus.

4



A convex lens has its focal length equals 4 cm. An object is placed at a distance of 6 cm from the lens. Determine the position of the formed image and its properties by drawing two light rays only.

Lesson 1 exercises

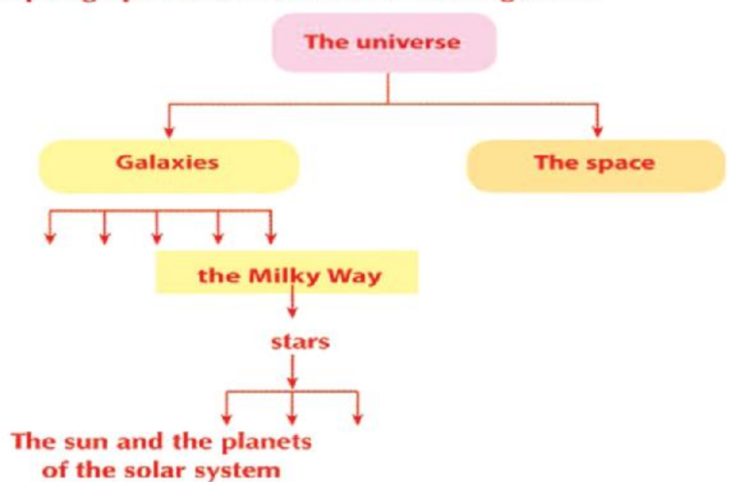
1 Write the Scientific term for each of the following:

a) It contains all the galaxies, stars,- planets and living organisms.
b) It contains all the stars we see at night in the sky.
c) It is located in one of the spiral arms of the Milky Way.
d) The expansion of the universe and the merging of atomic particles creating helium and hydrogen.

2 Put a(✔) or (✘) in front of the following sentences and correct the false ones:

a) The solar system is located in the Milky Way. ( )
b) The universe emerged from the particles of oxygen and nitrogen. ( )
c) The solar system contains many stars. ( )
d) Galaxies emerged from the Big Bang. ( )

3 Write a paragraph about each of the following terms:



4 Write the scientific term that corresponds each of the following statements:

a) The biggest star that can be seen clearly by people on Earth.
b) Eight planets that rotate around the sun.
c) A flat gaseous round disk that formed the solar system.

5 Write what you know about :

The nebula – the crossing star

6 Put a (✔) or (✘) in front of the following statements and correct the false ones:

a) The crossing star is the largest that can be seen form the surface of the earth. ( )
b) Nine planets rotate around the sun. ( )

Unit 3 Exercises

1 **Put a(✔) or (✘) in front of the following sentences and correct the false ones:**

a) The solar system is located at the edge of the Milky Way. ( )
b) Each group of stars is gathered in the solar system. ( )
c) The universe contains various galaxies that move away from each other. ( )
d) Eight planets including the Earth rotate around the galaxy. ( )
e) Galaxies rotate in a system around the centre of the universe. ( )
f) Galaxies move away in the cosmic space. ( )

2 **Give reasons for each the following:**

a) The continuous expansion of space.
b) Galaxies move away from each other.

3 **Write a paragraph illustrates each of the following:**

a) The crossing star theory.
b) The nebula.
c) The cosmic space.
d) The galaxy.
e) The solar system.

Lesson 1 exercises

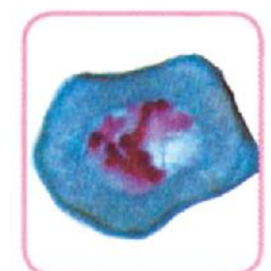
1 **Put a(✔) or (✘) in front of the following sentences and correct the false ones:**

a) Meiotic division occurs in somatic cells.
b) Meioticdivision produces cells that contain half of the genetic material.
c) The crossing over phenomenon occurs in the anaphase of first meiosis.
d) Meiotic division aims to production of the gametes.

2 **The following microscopic images illustrate the first meiotic division phases:**

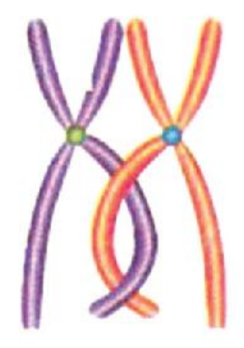
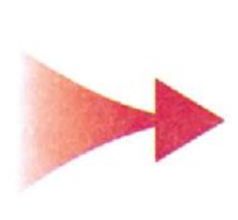
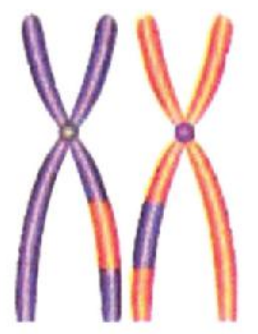
a) Identify each phase.
b) Arrange these phases according to the periority of occurrence.






3 **Compare between meiosis and mitosis in accordance to:**
The purpose of the division - site of occurrence – division phases – division results

4 **Explain the following phenomenon and state what is its importance.**

Lesson 2 exercises

1 **Compare between sexual reproduction and asexual reproduction in terms of the genetic traits of the resulted offspring..**

2 **Write the scientific term for each of the following:**

a) It is a process where the organism produces new individuals of genetic traits identical to parents.
b) It is the ability of some animals to compensate the missing parts.
c) It consists in living organisms of cells known as reproductive cells through meiosis.
d) It contains genetic material from each parent. When it grows, it gives a new affspring whose traits combine each parent's traits

3 **Put a(✔) or (✘) in front of the following sentences and correct the false ones:**

a) The offspring resulted from the asexual reproduction has traits different from the original organism. ( )
b) Sexual reproduction maintains the genetic structure of the living organisms. ( )
c) Amoeba is divided by the binary fission into two identical cells; each is similar to the parental cell. ( )
d) A bud emerges as lateral bulge in the cell then the cell nucleus divides meiotically into two nuclei; one of them remains in the parental cell and the other one immigrates to the bud. ( )

4 **Sexual reproduction is a source of genetic variation... explain.**

5 **Explain by drawing, How are gametes produced by sex cells through the meiotic division?**

Unit 4 Exercises

1 Put a(✓) or (✗) in front of the following sentences and correct the false ones:

a) Somatic cells are divided by meiosis division which leads to the growth of living organisms and compensation of the damaged cells.

b) Reproductive cells are divided by mitosis which leads to the formation of gametes

c) Chromatin reticulum condenses and appears in the form of long, thin and double strings (chromosomes) in the telophase of the mitosis division.

d) Meiosis results in the formation of two cells; each contains half the genetic material of the parental cell.

e) The asexual reproduction produces living organisms similar in their genetic structure.

f) Gametes in living organisms are produced by special cells known as the somatic cells during the meiotic division.

2 Write the scientific terms for each of the following statements:

a) A phase in which some important vital processes occur to prepare the cell for division and the genetic material in the cell is doubled.

(b) A phase in which the chromosomes migrate towards the cell equator where each chromosome is connected with one of the spindle fibers at the centromere.

(c) A phase where some processes occur upon which the formation of chromosomes that equal in numbers with the parental cell take place.

(d) It contributes in genes exchanging between the chromosome's chromatids and distributing them in the gametes.

(e) A cell division that occurs in the somatic cells and results in the growth of the living organism.

(f) A type of the asexual reproduction that occurs in unicellular living organisms, in which the nucleus is mitotically divided (mitosis) and then the cell which represents the body of the unicellular organism splits into two cells.

3 Explain how sperms and ova are formed in the human being?

4 Explain using drawing the crossing over phenomenon and its role in the variation of genetic traits among members of the same species.

Unit 4 Exercises

5 Clarify the importance of each of the following:

a) The meiotic division in keeping the number of chromosomes constant in the same species.

b) The sexual reproduction in the occurrence of the genetic variation.

c) The asexual reproduction in producing offspring identical to their parents.

6 What is the relation between the genetic structure for each of offspring and parents in the following cases and give the reason:

a) Binary fission in paramecium.

b) The plant resulted from germination of seeds.